

Application No. 10/680,973
Amendment dated October 4, 2005
Reply to Office Action of April 4, 2005

Amendments to the Specification:

Please replace the first full paragraph on page 15 with the following amended paragraph:

Dilator extractor 200' is configured so that retainer 218' is removed during the insertion of dilator extractor 200' into cannula 100. For example, while inserting dilator extractor 200' into cannula 100, bottom surface 215' of ring 209' comes into contact with trailing end 106 of cannula 100. Continued insertion of dilator extractor 200' into cannula 100 causes trailing end 206' of dilator extractor 200' to move toward ring 209'. Because retainer 218' remains attached at bottom surface 215', retainer 218' is removed from dilator 210' as dilator 210' is further inserted into the cannula. Once dilator 210' clears leading end 104 of cannula 100, dilator 210' moves into a deployed position. Trailing end 206' of dilator extractor 200' continues moving towards ring 209' until it contacts shoulder 207'. Shoulder 207' also acts to limit the depth of insertion of dilator extractor 200' into cannula 100. Shaft 213' has an attached cone 246'-that is pushed through retainer 218' so as to fully deploy the cone 246' when shoulder 207' of knob 222' meets ring 209'. Cannula 100 is stationary. Cone 246'The cone is welded to outside of shaft 213'. It is understood that any of the embodiments disclosed herein may include a configuration having a shoulder at the trailing end of the dilator extractor and a collar with a retainer attached thereto so that as the body is pushed through the retainer, the shoulder of the trailing end of the dilator extractor contacts the collar and the cone deploys.

Please replace the first full paragraph on page 17 with the following amended paragraph:

Grasper 300, as shown in Figs. 1 and 8, has a shaft 302 having a leading end ~~304~~, a trailing end ~~306~~, and a lumen ~~308~~ through the center of shaft 302 that can be occupied by a needle of a syringe device. Shaft 302 includes jaws 310, 312 at the leading end 304 for grasping tissue therebetween. As will be

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appreciated by those of skill in the art, grasper 300 may be adapted to have more than two jaws. For example, a third jaw may be used to provide a third grasping surface for grasping the tissue. It will be further appreciated that other jaw configurations are possible and within the scope of the present invention. Jaws 310, 312 may have a smooth grasping surface, or may have ridges.

Please replace paragraph 2 on page 17 with the following amended paragraph:

Shaft 302 preferably has a length in the range of 15 cm to 35 cm and an outside maximum cross sectional dimension of less than 5 mm. ~~Lumen 308~~ The lumen of shaft 302 preferably has an inside maximum cross sectional dimension in the range of 1 mm to 4 mm.

Please replace the paragraph bridging pages 17 and 18 with the following amended paragraph:

As shown in Fig. 8, ~~the trailing end 306 of~~ grasper 300 includes a pair of handles 320 for moving jaws 310, 312 relative to one another. ~~Trailing-The trailing end 306~~ The trailing end 306 also preferably includes first and second seals. The first seal preferably forms a duckbill "V" shaped valve made of a resilient material that forms a seal when no instrument is inserted into ~~the lumen 308~~. The second seal is preferably formed of a resilient material containing a through hole in its center. The through hole is preferably smaller than the maximum cross sectional dimension of the instrument that the through hole is adapted to receive and forms a seal when the instrument is inserted into ~~the lumen 308~~. For example, both seals may preferably be configured to permit the passage of a needle therethrough while inhibiting a loss of pressure from within the patient. It is appreciated that more than or less than two seals may be used without departing from the scope of the present invention.

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Please replace the first full paragraph on page 18 with the following amended paragraph:

~~Trailing~~ The trailing end 306 preferably includes a depth-limiting protrusion for limiting the depth of insertion of grasper 300 into the cavity. The depth-limiting protrusion may be formed as a shoulder, or may form a part of handles 320.

Please replace the paragraph bridging pages 19 and 20 with the following amended paragraph:

A preferred method of removing tissue from the abdominal cavity is shown in Figs. 8-10. Cannula 100 is inserted through the abdominal wall and into cavity 60, which is preferably pressurized. A cannula having a maximum diameter preferably in the range of 3 mm to 5 mm is used in order to make the procedure less invasive. Dilator extractor 200 is inserted into cannula 100 through seal 102 to a position where leading end 211 of dilator 210 extends beyond leading end 104 of cannula 100. Dilator 210 is expanded to form tissue extraction space 214. Grasper 300 is inserted into dilator extractor 200 through a pair of seals 222, 224 and through lumen 208. Shank 250 is bent by the insertion of grasper 300 as shown in Fig. 8 such that grasper 300 extends generally through the center of conical section 216 of dilator 210. A portion of grasper 300 interacts with shank 250 to cause shank 250 to move away from the mid-longitudinal axis of dilator extractor 200. The interaction of grasper 300 with shank 250 may occur while grasper 300 is being inserted through dilator extractor 200 in a direction substantially parallel to the mid-longitudinal axis of dilator extractor 200. The tissue is grasped by grasper 300 and manipulated into tissue space 214. If desired, grasper 300 may be locked to dilator extractor 200 to provide more stability. Next, an upward force is exerted on dilator extractor 200, dilating the trocar wound such that the tissue is removed from the cavity under the influence of the upward force. The upward force also causes conical section 216 to roll-

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up, creating a generally evenly distributed constricting force upon the captured tissue. The constricting force greatly reduces the risk of the tissue tearing or rupturing at the grasper/tissue interface.

Please replace the paragraph bridging pages 20 and 21 with the following amended paragraph:

Alternately, for tissue containing a fluid such as bile in a gallbladder, additional steps may be included such as suctioning out the fluid prior to the extraction step. For example, a needle of a syringe device is inserted into grasper 300 through the seals and through the lumen 308 to a position where the leading end of the needle extends beyond leading end 204 of body 202 of dilator extractor 200. Fluid is then suctioned from the tissue through the needle by the syringe. It will be appreciated that vacuum sources other than the syringe may be used to aspirate the tissue, for example, an aspirator. It will be further appreciated that aspiration may occur during other phases of the operation prior to the extraction of the tissue from the wound site. For example, a needle may be inserted through lumen 208 of dilator extractor 200 and fluid suctioned from the tissue before grasper 300 is inserted or used.